# MODIS TEAM MEETING

**Distribution:**

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|---|---|---|
| Richard Weber | **Bruce Guenther** | Larissa Graziani |
| Rosemary Vail | **George Daelemans** | **Bob Martineau** |
| **Mitch Davis** | Bob Silva | **Lisa Shears** |
| Ken Anderson | **Robert Kiwak** | **Mike Roberto** |
| **Rick Sabatino** | **Harvey Safren** | **Gene Waluschka** |
| Cherie Congedo | **Ed Knight** | **Bill Barnes** |
| **Jose Florez** | Harry Mongomery | **Les Thompson** |
| **Gerry Godden** | Marvin Maxwell | **John Bolton** |
| Bill Mocarsky | **Sal Cicchelli** | **Helen Phillips** |
| **Hongwoo Park** | | |

January 30, 1996 Attendees are marked in **BOLD and Underlined**

The Following items are included in this package:

1) SBRC Weekly Submission Memos form week 218
2) CDRL-521 - MODIS Weekly Status Rpt. week ending 2-2-96
3) MODIS Technical Weekly, 01-26-96
4) MODIS Technical Weekly, 2-2-96

**MODIS Technical Weekly** **January 26, 1996**
sent to MODIS.Review 1/30/96

**1.0 Introduction**
This year began with the second furlough of the fiscal year followed by the center being closed because of the blizzard. This is the first report of the new year.

Cherie Congedo arrived back at GSFC on January 22. She is the proud mother of a baby daughter.

Ken and Sandra Anderson are the proud parents of a new baby daughter, Rachel Susanne, born January 27.

Claire Wilda from Lockheed Martin at Valley Forge attended the MODIS team meeting on January 23. Claire indicated that Landsat schedule acceleration is under consideration. This could impact MODIS integration and test at Santa Barbara Remote Sensing (SBRS) and Valley Forge.

The quarterly management review was held at SBRC on December 12 and 13. Comments from the GSFC technical team are now being compiled.

The handout from Tom Koch of the systems integration and test coordination meeting for January 22 at SBRC was received via email on January 22. A few key notes from this handout are included below.

Comments from George Daelemans on the October, 1995 radiative cooler and aft optics assembly thermal/vacuum and thermal/balance test and suggestions from George regarding preparations for future environmental tests for MODIS are summarized.

Jose Florez provides status from the 1/22 electronics telecon with SBRC. Five of 31 hybrids (30 needed) are still being checked because of bent pins. FAM timing and control has completed temperature testing. Detector Division has requested a specification change to lower the bias supply from -8V to -9V. The bias supply filter was modified to lower the noise. Conformal coating will be completed at Hughes in LA; electrical continuity testing of the MEM wire-wrap backplane has been completed. The Format Engine board has been repaired, and test procedure to check board complete and will be forwarded to GSFC for review (1/22). T-bars on the Analog and Digital Telemetry boards were cut-off last week and the procedure developed to perform the cutting has been forwarded to Bob Silva for review.

Jose has documented information request on CCA alignment to backplane in PFM boxes. There is a record of the electronics telecon with SBRC on 1/16. A question is raised about recovery from mechanism loss of power.

Larissa Graziani mentions that the fold mirror has been cleaned after it's mis-adventure in the thermal oven and appears to Ron Peterson to be sparkling clean with no noticeable contaminants on the surface. The Landsat crew is now unhappily garbed in bunnysuits. Ron said that they removed all smocks from the gowning area. The AOA will be getting a place of its own soon. A tent is being constructed with an individual purge line so that our now-clean optics stay that way. Ron will be looking into what data exists in house on CTL-15 paint.

Bob Martineau provides status on flight model SCAs and detective assemblies and FPAs.

Tom Pagano forwarded information that SBRS believes the lag time for the scan mirror temperature sensing should not be a problem.

John Mehrten provides a brief overview of MODIS CSUB/ECAL operations.

**2.0 Tom Koch (Systems Integration & Test Coordination Meeting 1/22/96)**
The following contains excerpts from Tom Koch's meeting notes (Tom's Power Point presentation was converted to Word by David Jones):

a) The previous week's accomplishments for the OBA post-vibe verification included structural model evaluation of the S/MWIR E2 lens failure, continued cold focal plane assembly (CFPA) misregistration investigation, the decision to return to AOA test configuration, work on improving data reduction software, and the removal and cleaning of the ATA fold mirror.

Analysis indicates the lens failure could have resulted from vibrational load failure and that the cooldown loads were insignificant. Inspection of the AOA after demounting from the ATA indicated the LWIR aperture stop interferes with the LWIR cold shield.

b) The major activities for the week ending 1/26/96 include the following: Complete AOA test configuration setup & install AOA. Acquire post-vibe AOA baseline data set. Compare post-vibe AOA data to pre-thermal cycle AOA data. Remove wiretie holding LWIR aperture stop. Acquire registration data & compare to post-vibe baseline data. Assess post-vibe AOA registration data. Conduct additional AOA misalignment investigations, as necessary. Consent to rework SW/MWIR & LWIR objective assemblies. Setup optics to measure pre- & post- objective rework alignment. Replace E2 lens in SW/MWIR objective (Need Penalty Vibe Approval). Rebond aperture stop in LWIR objective assembly. Initiate Fold Mirror penalty vibe test operations.

c) The PFM mainframe I&A status and plans are as follows: The interior of the mainframe was cleaned and inspected (black light used). Contamination covers were installed. The scan mirror assembly was mounted into the mainframe on January 19. The tilt table proof load test procedure was updated. Scan mirror assembly alignment to reference alignment cube in progress. PFM OBC Blackbody delivery is due January 24. PFM Solar Diffuser due January 25. Cable tie bonding to be initiated. The cable

connector panel was not fabricated properly and will be replaced. Contamination witness sample(s) will be placed within the scan cavity to track contamination of optical components.

d) The status and plans for SI&T with EM electronics include the following: The validation of the GSE hardware and software is set to start on January 24. The recoating of the inner plates on the BCS (2) and SVS (1) are in process. The SIS(100) calibration is due to begin when TRMM testing is complete.

e) Additional activities include: The SpMA is being prepared for mounting and 3 to 4 week alignment testing. Preparing layout for framed contamination cover for AOA/OBA. The BTC delivery has been delayed because of problems with rate/monitor control loop (see summary of memo from George Daelemans in Introduction).

d) Consent to integrate reviews delayed. Data packages in preparation. For the RCA, data assembly is continuing. The mainframe needs data packages. The ATA is awaiting penalty vibration on the fold mirror.

**3.0 George Daelemans (trip report for PFM radiant cooler/AOP TV/TB testing during October, 1995; recommendations regarding preparations for future environmental testing in the MCC)**

George Daelemans has prepared a memo on the test at SBRC to determine the on orbit radiant cooler temperature margin and the adequacy of post EM modifications to the Aft Optics Platform to reduce background emissions. The cooler has a two degree margin (83K versus spec requirement of 85K). The test simulation conditions are considered worst case and George believes on orbit performance will improve the margin by an additional 1.5 to 4.0K. None of the channels saturated but the amount of background noise has not been reduced enough to allow the instrument to operate adequately above the currently predicted upper instrument temperature limit. A 10 degree C. qual limit buffer is needed.

George also has recommendations regarding environmental testing at SBRC.

1. The test plan should briefly provide the details of the test objectives, needed hardware and software, test article limitations, and expected test results. This will allow GSFC to understand the purpose and limitations of the test. The plan should also reference the PAR requirement that is being satisfied by the test.

2. The test procedure needs to be ready a few weeks before the chamber doors are closed.

3. The GSE and instrument temperature data collection should be automatically tied together. Some thought needs to go into how to make efficient use of this data during testing.

4. Before placing flight hardware in the chamber, assure all GSE hardware and software is ready.

5. Practice runs of the test chamber and other GSE hardware and software without the instrument are needed. This would allow personnel to become familiar with the chamber and other GSE operations and do any debugging in parallel with instrument integration and test instead of in series. There is also a safety issue with regard to chamber operations.

Details are in George's memo, "Trip Report of the Protoflight Radiant Cooler/AOP TV/TB Testing during October 1995", dated December 12, 1995.

**4.0 Jose Florez (record of telecon with SBRC 1/22/96; information being gathered on CCA alignment to backplane in PFM boxes; record of telecon with SBRC on 1/16/96; question to determine resolution of mechanism loss of power issue)**

Author: Jose Florez at 730
Date: 1/22/96 5:23 PM
Subject: **Record of telecon with SBRC - 1/23/96**

Record of telecon with Ed Clement (SBRC) and J. Florez and M. Davis

The hybrid issue is still open. 5 of the 31 parts (30 required) were not immediately accepted. The 5 had pins with extensive bending due to all the testing. The parts will under go further testing to see if the glass seals were damaged. If not, they will be accepted.

Of the FAM and SAM cards, only the FAM Timing and control has completed temperature testing. The SAM CLK_BIAS/TLM will start testing this week. The other SAM cards have been undergoing "engineering modifications". The Detector Division requested a specification change to lower the bias supply from -8V to -9V. And the bias supply filter was modified to lower the noise.

The conformal coating will be completed at Hughes in LA, due to the better process. SBRC brushes on the coating where Hughes sprays on the coating and has better inspections.

Electrical continuity testing of the MEM wire-wrap backplane has been completed. A few errors were found and corrected. SBRC will perform a vibration test on the backplane in the vertical direction with the pins facing down. The intent is to dislodge any loose pieces of wire. Another continuity test will be performed after the shake.

The test procedure for the Formatter has been released this morning and will be forwarded to us for review. The 3-board TCP procedure is expected to be

released tomorrow.

The T-bars on the Analog and Digital Telemetry boards were cut-off last week, but the connectors will not be removed until the replacement 184-pin connectors are received from Microdot. The procedure developed to perform the cutting has been forwarded to Bob Silva for review.

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Author: Jose Florez at 730
Date: 1/16/96 6:11 PM
Subject: **CCA's to Backplane Connector Alignment in PFM Boxes**

Jose,

The two persons at SBRS that can answer detailed questions about this issue are:

Ken Hermansen 805/562-4926 (no e-mail address)
Todd Hovey 805/562-7362 (same e-mail area as myself, only working mornings)

Todd, Ken,

what drawings would you suggest we supply to Jose Florez at Goddard so that they can complete the investigation described below? Please order these from EDCC and then give to me, I'll see that they get forwarded to Jose. Thanks Ed

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Subject: CCA's to Backplane Connector Alignment in PFM Boxes
From: Jose_Florez_at_730@ccmail.gsfc.nasa.gov at CCGATE
Date: 12/15/95 3:32 PM

December 15, 1995

Ed,

During a recent discussion with Mike Roberto the topic of CCA connector alignment to the backplane connectors was revived. A while back Mitch and I had requested our mechanical person, Cherie Congedo, to verify that the board alignment and tolerances in the three PFM boxes (SAM, FAM, and MEM) is adequate. The request was made after the experience with the misalignment in some of the SAM CCA's was discovered during EM integration. Obviously the concern is the stress applied to the boards and connectors inducing failures during flight. Unfortunately Cherie went on maternity leave before she could complete the task. We want to close this issue as soon as possible and will assign someone else if necessary to complete it.

In order to close this item we need to review the following information for each of the boxes:

1. Documentation (design study, analysis, etc.) that shows what the design parameters are tolerances are for the PFM packaging, to demonstrate adequate alignment.

2. Documentation (EO's, etc.) for modifications made to the EM packaging design for implementation in the PFM.

Would it be possible for you to get the above information, or can you point me to the right person to obtain it from?

We are again facing the possibility of a furlough next week, so maybe we won't be able to have our telecon on Monday. Just in case I want to wish Happy Holidays in advance!

Jose

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Author: Mitchell L Davis at 730
Date: 1/17/96 4:04 PM
Subject: **Record of Telecon with SBRC on 1/16/96**

Mitch,
Review and modify as you see fit.
Jose

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Telecon with Ed Clement (SBRC), M. Davis and J. Florez. Jan 16, 1996 4:30 pm

This was the first telecon with SBRC since the start of the furlough, so it covers approximately a four week period.

The PFM Power Supply is beginning acceptance testing at Torrance and expected delivery is by the end of this month.

SBRC and SYPEX have not definitely determined the cause for the failure in the Post-Amp hybrids. Their best theory is that the bottom of the package flexed under stress induced by pressure testing, causing the substrate to pop loose. A lot of 31 parts (30 parts are used in the PFM) has been accepted by Ed Schultz but it is not clear whether they passed all the tests that were performed, [the comment was that "they passed the 5000 G test and some passed the 10.000 G test".]. SBRC is placing an order for an additional 45 hybrids and are considering requiring a package with a thicker bottom, but have not made a final

decision. Sufficient Pre-Amp hybrids for the PFM and FM1 are available now.

On the issue of the 184-pin Microdot connectors, a batch of five is expected to be delivered by next week. A batch of 13 that was being processed was rejected last week. Another batch of five will be produced next using the hard copper wire used in the 128-pin connectors. Apparently SBRC is reluctant to process large batches out of fear of failures due to a limited stock of backshells.

Twenty 128-pin connectors were sent to Microdot for testing and no failures were detected. Ed could not confirm that cross-sectioning was performed on these connectors.

An in-house procedure to saw off the ends of the T-bars from the MEM boards has been developed and approved by Ed Schultz. To my knowledge nobody at GSFC has had a chance to review it. Two boards are being cut today. The rest will be done as the 184-pin connectors arrive. Apparently the procedure involves using a low speed saw that requires about 5 minutes to cut one bar.

The Format Engine board that had internal shorts due to a CAD system oversight has been fixed and is being tested. The fix required a two-step drill operation. A cross-section of the drilled-out holes was examined and accepted. A procedure for this operation was also developed by SBRC, but not reviewed by GSFC.

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Author: Jose Florez at 730
Date: 1/19/96 11:19 AM
Subject: **Final Resolution of Mechanism Issue per Loss of Power**

Bill,

Jose Florez at Goddard has requested information about the final resolution of the mechanism recovery plans pertaining to loss of power and/or loss of mechanism position information. Basically Goddard has seen a couple of memos, well spaced apart, that describe the problem of mechanism position due primarily to a loss of power while a door is being opened or closed, for example. Some ideas verse resolution included a software fix, or driving the door until the position switch is activated.

Question: Have these issues been closed? If so has a final memo or other documentation been written that can be sent to Goddard for their review? Please let me know soon so that I can get it to them. Thanks Ed

**5.0 Larissa Graziani (latest on the contamination control front)**
Author: Larissa Graziani at 420/421/422/424

Date: 1/23/96 11:54 AM
Subject: Latest on the CC Front

Thought I'd send you an update since I couldn't make the meeting...

Ron cleaned and inspected the fold mirror after it's mis-adventure in the thermal oven. As far as he can tell, it's sparkling clean and has no noticeable contaminants on the surface. The probable cause: the dry nitrogen (house supply) used to purge the oven was not filtered. The oven itself was supposedly wiped and pre-baked before the mirror was installed.

The Landsat crew is now unhappily garbed in bunnysuits. Ron said that they removed all smocks from the gowning area.

The AOA will be getting a place of its own soon. A tent is being constructed with an individual purge line so that our now-clean optics stay that way.

Ron and I had a short discussion on CTL-15 paint. His own experience with this paint is limited. He is going to check around to see what data exists in house on the vagaries of this paint. Stay tuned...

**6.0 Bob Martineau (FPA flight model status)**
January 23, 1996
FROM: 718.1/Robert J. Martineau
SUBJECT: Weekly Input for 1/23/96

1) Flight Model SCAs:

- All four hybridized SMWIR SCAs have been tested. A perfect SCA was found having no inoperable or soft pixels. SBRS is in the process of deciding whether it would be cost effective to build a replacement SMWIR DA to replace the present FM2 unit which has two soft pixels. Doing this would use up the back-up cable/pedestal assembly.

2) Flight Model 1 Detective Assemblies and FPAs:

- The NIR, VIS, and SMWIR F1 FPAs have been delivered. The F1 LWIR DA has completed testing and is waiting for a filter/bezel assembly from systems division.

3) Flight Model 2 Detective FPAs:

- The F2 VIS and NIR FPAs have been delivered. The F2 LWIR DA has completed testing and is awaiting a filter/bezel assembly. The F2 SMWIR DA completed radiometric tests. Its filter/bezel assembly is being built.

**7.0 Tom Pagano (Scan Mirror Temperature)**

Author: "Pagano, Thomas S" <tpagano@msmail3.hac.com> at Internet
Date: 1/24/96 11:21 AM
Subject: FW: Scan Mirror Temp
---------- Message Contents ----------
Mike,

Below are results from A. De Forrest group test on SMA temp sensor lag time.

Tom

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From: De Forrest, Allen L on Tue, Jan 23, 1996 2:52 PM
Subject: Scan Mirror Temp
To: Pagano, Thomas S

I had an action item from your Systems telecon last week related to the lag time measured for the scan mirror temperature monitor. The empirical data shows that it takes about 3 hours to achieve stabilization from room temp conditions to orbital simulation levels in the vacuum chamber (C-1 in Greg Hughes' lab). Perturbation of the measuring system after orbital conditions have been reached has caused a settling time of several minutes. The lag times have been very short.

Ron Choo believes that orbital variations smeared out over the 90 minutes will result in very small differences between actual mirror temperature and that sensed by the temp monitor.

Please pass this information along to the correct person at GSFC (Mike Roberto?).

**8.0 John Mehrten (MODIS ECAL/CSUB Ops)**
Author: "Mehrten, John A" <jmehrten@msmail3.hac.com> at Internet
Date: 1/24/96 11:53 AM
Subject: FW: FYI MODIS ECAL/CSUB Ops
---------- Message Contents ----------
As indicated, an FYI...John Mehrten

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From: Mehrten, John A on Wed, Jan 24, 1996 8:56 AM
Subject: FYI MODIS ECAL/CSUB Ops
To: SBRS Sys Eng. & SI&T

FYI - - This msg provides a brief overview of MODIS CSUB/ECAL operations. Ken Shamordola & Mike Slonaker provided most info. This covers the main topics of CSUB/ECAL; some details may not be addressed.

1. ECAL/CSUB Similarities - - ECAL produces stair step test signals for both

PV and PC FPAs. PC has fixed parameters to produce 16 ECAL steps. PV has ECAL cmd options. CSUB only applies to PV SMIR and LWIR CFPAs. CSUB is a charge subtraction process that removes background flux during ambient conditions to produce usable PV SMIR & LWIR signals for some test operations.

> PC FPA detectors remain connected at all times. PV FPA detectors are disconnected during ECAL, and remain connected during CSUB.

> For ECAL, a step occurs each collect IFOV or unformatted frame (UFD). Because of different band IFOV offsets, bands within the same formatted frames (FDs) may not exhibit the same step level.

2. PV CSUB/ECAL Parameters (n/a PC) - -
> ECAL: VCAL, NSTEPS, NFRAMES (VCAL & NSTEPS by cmd; NFRAMES by upload).
> CSUB: VCAL, NSTEPS.

3. Effect of PV Parameter Chg (n/a PC) - -
> ECAL: VCAL: 0 to +V adds signal; NSTEPS: more steps = more chrg/frame; NFRAMES: how many frames/scan
> CSUB: VCAL: 0 to -V subtracts signal; NSTEPS: more steps = more chrg/frame.

4. Basic Controls - - Cmds for in use Pri/Rdt side.
> ECAL: ON/OFF Logic cmd, per PV FPA; Relay cmds PC.
> CSUB: ON/OFF Logic cmd, SMIR & LWIR FPAs (n/a PC).

5. Views/Termination - -
> ECAL: Over SD View for PV; over BB View for PC; within any scan, automatic termination for both after NFRAMES. For example, after the PC fixed 16 Frames, remaining BB view collects will be normal BB data. The ECAL process continues until commanded OFF.
Normal data will be acquired for other non-ECAL views.
> CSUB: For PV (n/a PC), occurs continuously over all views for SMIR/LWIR until commanded OFF.
Normal data will be acquired for non-CSUB PV FPAs.

MR
1/30/96